

DRAGON USER



May 1987

The independent Dragon magazine

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Dragon Answers

Don't Cudge answers your questions

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Competition

David Lee shuffles people over what they spell and Ductech offers copies of Exploring Adventures on the Dragon for the winners

No Expert this month

Did someone drive a stake through his heart? Moushnik — he just got lost in the post. Hello he back

Editorial

THIS Sixth Show was small but busy, and I had the opportunity to catch up with quite a few names and faces. I left late and still didn't get to talk to all the people I wanted to talk to, apologising that I was on the ones who are hardest to get hold of, and could quite happily have kept myself occupied till wrapping up time if circumstances had permitted.

Cheers again to everyone who came along, and special thanks to Jimmy Pope who organised the show, Jason for answering really questions and arranging everything he could lay his hands on, Helen Perry and David Owen for letting and carrying and personally personing the stall in the afternoon, Tim Lewis of NDUG for offering me a pint which I didn't have time to drink, Alan Preston of H & A Preston for contributing some Boulder Creekers above the call of duty to help us out of an embarrassing situation, and above all to EVERYONE WHO RE-SUBSCRIBED TO DRAGON USER. In the heat of enthusiasm or the depths of despair it is easy to forget that this year you've got to remember your ads, or we won't know you're there, and we won't be. Don't forget.

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How to submit articles

The quality of the material we can publish in Dragon User each month will be a very good indicator of the quality of the material we can publish in our magazine. The quality of the material we can publish in our magazine will be a very good indicator of the quality of the material we can publish in our magazine.

Articles which are submitted to Dragon User for publication should be in the form of a letter to the editor, 10-12 lines long, and should be typed on one side of the paper. The letter should be typed on one side of the paper, and should be typed on one side of the paper.

We cannot guarantee to return every article, but we will return every article which is returned to us. We will return every article which is returned to us, and we will return every article which is returned to us.

which is selected is from 1000 to 1900 each time the player successfully enters the correct sequence of numbers. It is necessary to save the second character in the string in line 1002 because many numbers generated by the RND command are preceded by a space when the number is converted to its string representation by the STR\$ command. The space character in line 1002 copies the appropriate page to the appropriate screen and produces the corresponding note. The length of time for which the number appears is controlled by the length of the wait which gets progressively shorter as the player progresses to remember longer sequences. The shuffling around of pages in lines 1004 and 1005 is necessary in order to avoid losing any combinations and to

ensure that the correct page(s) appear the next time around. This shuffling occurs in the other place reserved for the combination.

The response of the player is selected in lines 1000 to 1005. A correct answer produces suitable display on the next screen. Since it would be a pity to return to the undrained mode at this stage, and since also there are many graphics pages available, then a different approach was considered desirable. The display is generated by POF\$PAGE in 1006 the values contained in the DATA statements hold on lines 1000 to 1005. The graphics concerning the first being the location and the second being the code for graphics character. Lines 1007 to 1008 reset the pages and the screen and return back to 1000 for another value to be added

to the sequence and the display to run again. This time a little faster.

Incorrect answers are dealt with in lines 1010 to 1016, generating a number of correct answers until the player gets it. The time taken to write out the response on screen is limited, how important the PCOPY command is to the running of this game. Finally should the player reach the grand total of a sequence of 20 correct answers, then the evergreen medieval tiled window gives the player a chance to reap the fruit.

Should anyone not like the task of typing in all the progress then I would only be too pleased to send them a cassette if it they send me five pounds (5.00 Graphs. Plus Twelve Languages) or AlphaGraphics Digid 0000 4HD 004.000.

```

410 'DRAW BORDER
420 LINE 1, 1-1255-1, 95-1, PSET, 8
430 LINE 1, 1+95-1255-1, 191-1, PSET, 8
440 RETURN
450 'DELAY
460 FOR C=0 TO 10000: NEXT
470 RETURN
480 GOSUB 1000
490 CLS:PRINT#1:PRINT "A game"
500 PRINT#1:PRINT "1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-1044-1045-1046-1047-1048-1049-1050-1051-1052-1053-1054-1055-1056-1057-1058-1059-1060-1061-1062-1063-1064-1065-1066-1067-1068-1069-1070-1071-1072-1073-1074-1075-1076-1077-1078-1079-1080-1081-1082-1083-1084-1085-1086-1087-1088-1089-1090-1091-1092-1093-1094-1095-1096-1097-1098-1099-1100-1101-1102-1103-1104-1105-1106-1107-1108-1109-1110-1111-1112-1113-1114-1115-1116-1117-1118-1119-1120-1121-1122-1123-1124-1125-1126-1127-1128-1129-1130-1131-1132-1133-1134-1135-1136-1137-1138-1139-1140-1141-1142-1143-1144-1145-1146-1147-1148-1149-1150-1151-1152-1153-1154-1155-1156-1157-1158-1159-1160-1161-1162-1163-1164-1165-1166-1167-1168-1169-1170-1171-1172-1173-1174-1175-1176-1177-1178-1179-1180-1181-1182-1183-1184-1185-1186-1187-1188-1189-1190-1191-1192-1193-1194-1195-1196-1197-1198-1199-1200-1201-1202-1203-1204-1205-1206-1207-1208-1209-1210-1211-1212-1213-1214-1215-1216-1217-1218-1219-1220-1221-1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1405 DATA 402,149,421,148,422,146,423,147,425,154,426,154,429,149,431,146,432,14
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1539 C$=C$+PCOPY%>0:GOTO 1030
1540 C$=C$+PCOPY%>0:GOTO 1030
1541 C$=C$
```

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Dragonsoft

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Thinking person's boulders . . .

Program: Stone Reader II
Supplier: Microquest
Price: £5.95

This and numerous supplied with this game testing your ability to find the correct answer to a wide range of questions. The Stone Reader II is a puzzle game for the 256-colour screen. The number of questions ranges from one to 128, but the number of games to collect does not reflect the difficulty of the game. Once the game has been collected, you have to find your way to the finishing line.

Stone Reader II is a puzzle game for the 256-colour screen. The number of questions ranges from one to 128, but the number of games to collect does not reflect the difficulty of the game. Once the game has been collected, you have to find your way to the finishing line.

You control your man using the right arrow key. Generally, most screens become slightly more difficult as you progress through the game, but some screens have no score, some have no score, some have no score. The 256-colour screen is a nice touch, but I am not a collector!

Top class up a game of your own!

to think about your next move as moving the wrong way may lead to a loss of 100 points or 100 points could be lost if you're not in a rock fall or fall-off the edge.

There are 25 screens and considering you only start with three lives, it's a bit of a challenge. It's a good idea to have a strategy which enables you to change the number of lives, start screen and speed score. The difficulty is a good idea for people who are not too good at gaming, and it's a good idea to have a strategy which enables you to change the number of lives, start screen and speed score.

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Robert Morgan



DOS DISC ROM

Program: DOSplus 2.7 Data ROM
Supplier: P. G. Scott - Alderbrook
Price: £15.00

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Robert Morgan



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Program: Disk
Supplier: H. G. Anderson
Price: £10.00

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Searching techniques

Dene Bebbington shows you how to find quickly what you're looking for

MANY users have probably used some form of searching while programming as the need to search lists of data arises in many applications — eg databases, mailing lists etc. In these applications searching is often one of the most used processing activities, so it is desirable to keep the time spent searching to a minimum. Searching methods will vary greatly in performance.

When measuring the performance of searching routines we count the total list of probes actually made in order to find the item we are looking for. If we use this approach the number of items in the list itself is not just the number of probes in total as this can vary from N (just 1) depending on the method used. If we choose a good method searching time can be greatly reduced.

The method chosen depends on whether the list is sorted or not. Most of the time it is much faster to search a sorted list than an unsorted one, but there is an exception in the case of hashing — this will be looked at separately.

Unsorted lists

First have an unsorted list to search then is a simple technique we can use. Start at the beginning of the list and evaluate each successive item until the one you are looking for is found or until you reach the end of the list if it is not there.

This method is known as a **LINEAR SEARCH** and is easy to implement. See listing one for an example. Here 10 is the item being searched for and the list is held in array A(1) of length N (10) (usual integer list then control is transferred to line 50 above in the program jumps to line 70 with its position stored in I).

Listing 1

```
10 I=0
20 I=I+1
30 IF A(I)=A% THEN GOTO 70
40 IF I=N GOTO 20
50 PRINT "NOT FOUND"
60 END
70 PRINT "FOUND AT " I
80 END
```

This method is not suitable for anything but small lists as in the worst case (where the item is at the end of the list) it needs to check N items. In the best case (where the item is at the start of the list) it will only need to make one probe. Thus, on average, it will only need to make $N/2$ probes for successful searches. For unsuccessful searches it will always have to make N probes.

Sorted lists

If we have sorted lists then we can make use of this order to improve searching times. We could use the ordinary linear search but this would be inefficient as it does not take into account the ordering of the list, and would make unnecessary probes.

Firstly there is the 'stair step' linear

Listing 2

```
10 I=0
20 I=I+1
30 IF A(I)=A% THEN GOTO 70
40 IF A(I)/4 < A% AND I < N
   GOTO 20
50 PRINT "NOT FOUND"
60 END
70 PRINT "FOUND AT " I
80 END
```

search, which is essentially the same as the ordinary linear search except that we can stop searching if the item we are looking for is less than the current item being looked at (see listing two). Below is an example. The item we are looking for is the name Henry and hence we would stop searching at the name Henry.

LIST Alan David Eric Gordon Henry Ian Mark Paul Robert

This search method only has to make $N/2$ probes on average (if the item is in the list at all, which makes it better than the ordinary linear search for sorted lists).

Secondly there is the **BINARY SEARCH** which is a very efficient searching method for any sorted list. The way this works is to split the list in half and see if the middle item is the one we are looking for. If not, it works out which half it should be in and then repeats the process.

Thus we are halving the size of the list to be looked in after each probe. Below is an example of the probes we would need to make to find the name Paul.

List	(1)	(2)	(3)
Alan			
David			
Eric			
Gordon			
Henry	Henry		
Ian			
Mark		Mark	
Paul			Paul
Robert			

From the point at which the item searching is stopped when the length of the subset being examined is 1.

Using the binary search we find that the item is in the list after only 3 probes (as shown in the best case) and only log N (base 2) probes are needed in the worst case. If the item is not in the list then log N (base 2) probes will always be needed. We can see

Listing 3

```
10 IF I=0
20 T=H
30 M=PI>((B+T)/2)
40 IF M=0 THEN GOTO 60
50 IF M=1 THEN T=T+1 ELSE B=B+1
60 IF T=B GOTO 30
70 PRINT "NOT FOUND"
80 END
90 PRINT "FOUND AT " H
100 END
```

that the binary search is significantly better than the other two methods looked at. It is not very difficult to make sure in that most are used in applications where sorted lists are used (see listing three).

Hashing

Another form of searching is hashing, which is not strictly a form of searching but more of mapping items into a list, leading to efficient searching. A hashing function is applied to the item which generates the position in the list where it might be stored. A problem arises when a collision occurs (where the position is already occupied). Some way of handling the collision is needed.

If we can devise a hashing function which results in a low number of collisions then searching will be faster. If we could find a hashing function which leads to no collisions then all searches would only need 1 probe, however we can't really expect this as searching using hashing will have more than 1 probe but will be more efficient than the other methods looked at.

Generally we find that the best results are obtained when the size of the list is a prime number, for example if we want to hold about 100 items then it is better to use a list of size 101 rather than 100.

Here I will present a hashing routine which leads to quite good results most of the time. A secondary hash function would be a collision occurs and the collision occurs

again from the item is inserted in the next free position in the list — this is known as **LINEAR PROBING**.

The way this works is to take up the ASCII value of the character in the item (B) and then to multiply this by the length of the item giving T. The value of T mod P is then calculated and T is added; this is then used as the position in the list to inspect. If there is a collision then we use the secondary hash function which is the original hash function plus the length of the item. If there is still a collision at this position then we examine each consecutive location until a free position is found; whilst doing this we "slide" to the beginning of the list if the end is reached.

Listing four is an implementation of the method set out here, and would easily be converted for use in a database, stock control system etc., while the hashing function could be changed to improve the performance.

As can be seen from the program each character being applied to the hash function to the item being searched for. If division is not at this first location then we apply the secondary hash function to the item. If at this first location the item is not found then linear probing is used until the end of our 100 slots have been reached and then we return to the first location as before.

Another searching method is available in a lot of systems called unsorted lists. Just like the **PARTITIONED LIST SEARCH** as it really works is to partition the list so that only the relevant partition need be searched. For example if we are dealing with items consisting of just letters of the alphabet then we can partition the list into 26 parts, each part containing items beginning with a different letter. Thus the first partition contains all items beginning with A, the next with B and so on.

We can use an array available to hold the partition information. The first entry in the table says where items beginning with A start. The next where items beginning with B start etc. When searching we can then use this table to find the relevant partition to search.

See below for an example list and table.

LIST	PARTITION TABLE	
A 1	1 1	10 9
A 2	2 9	15 0
B 5	3 4	16 11
C 4	4 0	17 8
C 5	5 0	18 0
D 6	6 6	19 13
E 7	7 7	20 0
E 8	8 0	21 16
F 9	9 0	22 0
F 10	10 0	23 18
G 11	11 8	24 0
G 12	12 0	25 9
G 13	13 0	26 19
G 14		
G 15		
G 16		
G 17		
H 18		
I 19		
J 20		
J 21		

As can be seen from example, all items beginning with R start at position 1 (those beginning with B start in position 2 and so on, ending with those beginning with Z starting at position 19). Any entries in the table with a zero mean that there are no items beginning with the corresponding letter. Also, the last non-zero entry in the table represents the end of operation.

To implement this search we need 2 routines, the first routine creates the partition table (listing five) and the second routine finds the end of the partition which the item being searched for is in (listing six).

Using this method we can apply either

the linear or binary search to the appropriate partition, the improvement in performance is greater with the linear search than with the binary search. The improvement comes from the fact that it only needs to examine likely items. For example, if we are searching for the name Paul then we need only look at the data beginning with P.

The searching method chosen for use in an application will depend on whether sorted lists are being used, what performance is required, and also how much space is available. Generally the binary search is a good choice for sorted lists, and hashing for unsorted lists.

Listing 4

```

10  *SEARCH PROGRAM* WOULD GO HERE.

20  GET STR$@P&255 * 11

30  GET PH *C*P&10-LE*P&10 *N*H&11

40  * ROUTINE FOR INSERTING ITEMS.

50  ASSUMES DIR RECV'D HAS BEEN DONE.

60  T=0

70  FOR I=1 TO LEN(K&T)

80  T=T+ASC(HEX$@K&T,I,1)

90  NEXT I

100 T=T+LEN(L&B)

110 IF RECF&H *I* > 10000 GOTO 210

120 RECF&H *I* = K&T

130 RETURN

140 * SECONDARY HASH

150 HP=FB *I* > 100 * LEN(P&B)

160 IF HP=0 THEN HP=HP+H

170 IF HP<0 > 0000 GOTO 270

180 RECF&HP = K&T

190 RETURN

200 * LINEAR PROBING

210 HP=HP+I

220 IF HP=0 THEN HP=HP+H

230 IF RECF&HP = 00 THEN RECF&HP = FB ELSE GOTO 270

240 RETURN

```



```

200 ROUTINE FOR SEARCHING
210 IF L1 IS ITEM TO BE FOUND
220 IF L1 IS POSITION L1 FOUND AT
230 IF L1 IS NOT FOUND THEN P=0
240 P=P+1
250 IF P=0
260 FOR I=1 TO LENGTH
270 P=P+SEARCHLENGTH I
280 NEXT I
290 T=T+LENGTH
300 IF SEARCH NOT L1 THEN
    P=0
    RETURN
310 PRINT SEARCHLENGTH
320 IF P > 0 THEN P=P+1
330 IF SEARCH L1 THEN P=P+1
340 PRINT P
350 IF P=P+1 GOTO 320
360 RETURN

```

Listing 8

```

100 REMOTE P=0
110 REMOTE DIM P=0 AND SEARCH P=0
120 PRINT P IS THE PARTITION TABLE
130 I=1
140 I=I+1
150 CH=LEFT$(P,I)
160 X=SEARCH-P
170 IF P=0 THEN T=0
180 IF CH(2) AND I=0 GOTO 140
190 RETURN

```

Listing 9

```

200 IF L1 IS ITEM BEING SEARCHED FOR
210 IF L1 IS THE END OF THE PARTITION
220 CH=LEFT$(L1)
230 PRINT SEARCH-P
240 IF P=0 THEN PRINT
250 IF I=0 GOTO 260
260 G=0
270 G=0
280 RETURN

```

STOP PRESS . . . NEW TITLES . . . STOP PRESS

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Introduction to wordprocessing

Roger Merrick checks off the vital points of computerised text handling in the first of two articles

It would be nice if there were a way with a need to do my writing work on paper and preferably some experience with automated typewriter. The single most useful purpose that a home computer system can easily serve is that of word processing.

For the beginner or the unworried, the computer must be able to demonstrate some advantages over the traditional methods of pen — or typewriter — and paper. Why would I use a word processor when I could scribble something in a piece of paper with a pen?

Given that the hardware and software requirements are met, a wordprocessing system offers the following advantages over the alternatives:

- It's high standard of presentation — readable from running, closed-out top. Tips:
- o Is only touching of text — if you're stopped, or if you're going, you're writing, then you're writing it. If a better way of expressing yourself occurs to you, get more — to make your point more clearly. (Or, to make your point more clearly.)
 - o If you're going, you're writing, then you're writing it. If a better way of expressing yourself occurs to you, get more — to make your point more clearly. (Or, to make your point more clearly.)
 - o If you're going, you're writing, then you're writing it. If a better way of expressing yourself occurs to you, get more — to make your point more clearly. (Or, to make your point more clearly.)

For the computer system to stand any chance of competing with the late-1980s systems on microprocessors, it must be able to

The computer system consists of three modular components:

- 1) the computer system hardware
2) the word processing software
3) the user

[illegible]

professor of work, or has any special interest that involved providing written tests that provided other conditions are met it would (professor will offer a big relevant improvement over alternative methods of assessment)

- By the late 1960s, records are starting to refer, to "follow instructions." It is a good sign that our own lack of understanding neither then, always obtaining the equipment, yet it is not when the instructions provided are incorrect and clearly not it is as early as possible to write notes. Third and, also, stage of (perhaps) keyboard learning: "You don't need to be a fourth hand to use a word processor" indeed, in my opinion it is undeniable because fourth hand is not taught to type in a certain way (because of the constraints of the mechanical keyboard) but you would find it helpful to have a pretty good sense of where each key is.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	

- is unless the hardware is a self-contained portable system (in which case the point-point connection between the computer systems should be through a console screen where all the user needs to do is watch it go (and, I will confess, load the software) — you're on to a loser if instead of picking up a few bucks you've got to beg for it. If the odds aren't too bad, call it to the computer room first. It's free (only plug adapter etc., etc.) and think about for an hour.
- For the system showing some of computer monitor problems (one or more dead pixels)

THE

- larger and lower case
- at least 80 by 24 characters
- display screen as letters
- all three typewriter-quality keys
- no standard overly busy layout (including justification keys, shifted numbers (i.e. 12345), and no locking)
- if memory of the page sufficient to allow after operating system and wordprocessing software, stored as all pages of text (Note: this PDA is free, but not less "You are I have this special feature: the screen should be as big as the original document can be printed in, and it will be printed in the amount of space that I use before it. The printer will effectively use 7 or 8" and space along the screen and will go down the screen without a line that — 8" but it is a screen that is designed as if it is an opening out of memory space which adds to the time required, leaving document breaking it into a number of parts and slowing down the operation of the software so for example, using drawing operations have to be carried out in a memory of the memory file. The next preoccupation is whether about 20% of it maximum, and if then, then, but out of space. Though I think that every day most documents I create are far less than the screen is large.

The monitor should be high quality, high resolution, because of the color calibration.

ing quieting periods of time up close to it. The screen should be large enough to display characters that the user can read without strain. (Back, and when monitors are not only cheap jobs to install, it should be positioned at an appropriate height so that the user does not need to look up to look at the screen.)

Wordprocessing doesn't require colour or sound, but whether either of these are desirable will depend on the software. Cost and movement of sufficient quality still cost a lot of money. Another problem is that most are not in any degree of high enough resolution to be really usable in wordprocessing unless the working situation permits the screen to be positioned at some distance from the user.

Spitting at cartoons who spend entire days at home monitors watching a distorted America? PCW monitor, as well as Director and more nightmare ones. I would recommend that a report using very honest data should be made together by the monitor as it is the place from the screen is living in the environment where the resolution therefore. Experiment III you have computer monitor. — Carl I will not acknowledge that there were very good results obtained in 1971 later and even a TV and a Director (with no) (with no).

- not too much should use ordinary paper
- could be more expensive but always a way to get better: professional typesetting company
- not too much because it's still a way to find the output computer
- The printer should use an ordinary ribbon or standard carriage
- not too much carriage or ribbon, split print because they are too expensive in use
- not highly specialized ink units, eg. the old ink, in a glass tube of the Olivetti Spangol printer because you try getting them when the Spangol is discontinued (you can't get it) or you can't find the support before their windows, like Dots and for the Olivetti
- which costs less to a current standard — split ink, color, high quality printer
- which is able to produce the full ASCII range of characters
- which produces print that is of readable quality

In my opinion, I've spent that money wisely. It's not a major problem in word processing — you can always have a cup of coffee while the printer is working. (Once again, this is true for letters or memos.) But when it's the real problem of you are creating longer documents or writing to a deadline — that's if you buy a standard machine — it may come again, so you may buy a 20 or larger buffer if you need it. Alternately, your software may support background printing, where printing is done in the background, so the keyboard and the visual feedback of a cursor on the screen of the

Into the directory

Paul Daglish opens up the Dragon DOS directory for programmers

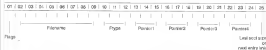
THIS article is intended to give an overall view of the organisation of the Dragon DOS directory. It was compiled into writing a while I read the article by D. Ratbury on page 61 of Dragon User November 1989. It did describe a lot of the information presented here but ignored parts which tend to cause difficulty to programmers trying to enter directory entries: programs for themselves, notably when directory entries have been introduced DOS. Despite this complementary information will help you to understand more clearly how the

program works. I have repeated a few points of what I heard, but this is best and I have tried at presenting a complete reference document.

As most regular readers of Dragon User know, the Dragon DOS directory is stored starting at the third sector of track two on disk and runs to the end of the disk, a total of 10 sectors. The whole directory is organised into slots, each of which is 10 bytes long. Thus each sector has room for 10 slots with bytes left over at the end (the three free bytes which are used in Mt

Petitory program to store directory files). This then, provides us with a theoretical maximum of 100 files on a disc. Although each file has only one entry in the directory, each entry can be composed of one or more slots (thus reducing the possible number of files in the directory). This distinction between slots and entries must be always born in mind.

The first slot of a directory entry always has the same format, as shown diagrammatically here:



Each initial slot is divided into eight bytes

byte	1	Flags
bytes	2 to 9	Filename
bytes	10 to 12	Filetype
bytes	13 to 15	Parent 1
bytes	16 to 18	Parent 2
bytes	19 to 21	Parent 3
bytes	22 to 24	Parent 4
byte	25	8028A.DMK byte

These fields are described in detail below

Byte 1 entry status flags

Bit No.	Meaning	Meaning
0	Entry Type	0 = Header entry (General) 1 = Continuation of another entry
1	Protection Flag	0 = Not protected 1 = Protected
2	Directory entry flag	0 = Does not exist in directory 1 = Is in directory
3	Continued flag	0 = No continuation 1 = This entry is continued
7	Valid file flag	0 = Throttle OK 1 = File has been deleted
2, 4, 6		Not used

Bytes 2 to 12, Filename and filetype

Bytes 2 to 9 contain the ASCII filename (eg. THISPROG.) and bytes 10 to 12 contain the ASCII filetype (eg. .BMP). The filename is less than 8 characters long (the rest of the filename in the directory is padded out with zeros). The filetype is one character less than 3 characters (the rest of the filetype is padded out with zeros). The filename and filetype are stored in the directory as follows: The file name THISPROG.DAT will be stored as follows:

Byte No.	2	3	4	5	6	7	8	9	10	11	12
Hex Value	4D	58	50	52	4F	4F	50	58	44	41	54
ASCII value	M	Y	P	R	O	G			D	A	T

Bytes 13 to 24, File storage pointers

Data (with file name) is stored on disc in clusters. A cluster is simply a block of storage allocated on the disc. It is always an integral number of sectors long. When DOS writes a file to disc it allocates a file cluster and stores the data in this space. However, because of fragmentation of the disc due to file deletion, the original cluster may not be big enough for all the file to be stored. In this case DOS finds another free cluster and continues its storage data here. This process of finding unused holes on the disc and using them continues until all of the file is stored (or no more holes can be found — DF ERROR). Thus to recover the file a user needs to write the file's location and sector of each cluster as well as the order in which they were stored. This is what the storage pointers do. Each storage pointer contains two values: 1) a two-byte Logical Sector Number (LSN) of a cluster, and 2) a one-byte cluster sector number. The location of each cluster is given by the LSN. This is a number which starts at sector zero and goes to the maximum number of sectors on a disc (logical sector zero 40 track disc). It is calculated by multiplying the track number (starting at zero) by the number of sectors per track (16 for DRAGON DOS) and then adding the sector number (the first sector starting from zero). That is, the LSN of the Dragon DOS directory is a track 30 sector 3, has an LSN of 360 (30 x 12 + 3). It can be seen that the first sector of the second file has an LSN of 16. As an example let us consider a file which is stored in three clusters as follows:

cluster 1	6 sectors starting at track 3 sector 3
cluster 2	12 sectors starting at track 39 sector 1
cluster 3	4 sectors starting at track 11 sector 15

This gives us the following LSNs:

LSN cluster 1	= 3 x 12 + 3 = 39 (002A HEX)
LSN cluster 2	= 39 x 12 + 1 = 469 (1D05 HEX)
LSN cluster 3	= 11 x 12 + 15 = 135 (8703 HEX)

Since clusters are contiguous on the disc the above clusters will cover the following sectors:

cluster 1	track 3, sectors 3 to 8 inclusive
cluster 2	track 39, sectors 1 to 12 inclusive
cluster 3	track 11, sector 15 and track 12, sectors 1 to 4 inclusive

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

[illegible]

Using the above cluster allocation scheme for a 160 Mbit/s long called POC (Polarized Optical Code) [24], the directory will be changed to:

gives an *adjacency matrix*. This is done using the *list* Ruler thing at the first byte of an *edge*. It has full detail there as to *adjacency* (note it is a *directed* adjacency and we should know at least *half* of the *edges* from bytes 2 to 12). It has flag to tell them the *adj* cost (allowing it *edges* not *costs* are *costed* info) and *adjacency* (the *edges* of the *adjacency* and *adj* are *adjacency* on *edges*).

If the Protection Register in the first byte of the directory entry has indicated to DCL that the file may not be deleted. This bit is established by using the `PROTECT` `DISKOP` command.

Only Inval flag in the Valid flag field which indicates if the file has been deleted or not. Answer is created by the system and has the flag value 1=0. If the file is subsequently

(variable) *SYMBOL* (type) *TYPE* (type) and *NAME* is the EBCDIC address of the program (three bytes) and *DATA* (type) is to tell BASIC where to find the description of the program when BASIC is typed) The *TYPE* byte (type) also has the type of *NAME*. I assume the file is in a formatted BASIC program used in class using the BASIC command only using a formatted parameter. (type) BASIC is used using the value of the parameter to define the address, as described above. The type of the file will be not independent of the file to be in machine code file (usually used by DOS 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0, 23.0, 24.0, 25.0, 26.0, 27.0, 28.0, 29.0, 30.0, 31.0, 32.0, 33.0, 34.0, 35.0, 36.0, 37.0, 38.0, 39.0, 40.0, 41.0, 42.0, 43.0, 44.0, 45.0, 46.0, 47.0, 48.0, 49.0, 50.0, 51.0, 52.0, 53.0, 54.0, 55.0, 56.0, 57.0, 58.0, 59.0, 60.0, 61.0, 62.0, 63.0, 64.0, 65.0, 66.0, 67.0, 68.0, 69.0, 70.0, 71.0, 72.0, 73.0, 74.0, 75.0, 76.0, 77.0, 78.0, 79.0, 80.0, 81.0, 82.0, 83.0, 84.0, 85.0, 86.0, 87.0, 88.0, 89.0, 90.0, 91.0, 92.0, 93.0, 94.0, 95.0, 96.0, 97.0, 98.0, 99.0, 100.0, 101.0, 102.0, 103.0, 104.0, 105.0, 106.0, 107.0, 108.0, 109.0, 110.0, 111.0, 112.0, 113.0, 114.0, 115.0, 116.0, 117.0, 118.0, 119.0, 120.0, 121.0, 122.0, 123.0, 124.0, 125.0, 126.0, 127.0, 128.0, 129.0, 130.0, 131.0, 132.0, 133.0, 134.0, 135.0, 136.0, 137.0, 138.0, 139.0, 140.0, 141.0, 142.0, 143.0, 144.0, 145.0, 146.0, 147.0, 148.0, 149.0, 150.0, 151.0, 152.0, 153.0, 154.0, 155.0, 156.0, 157.0, 158.0, 159.0, 160.0, 161.0, 162.0, 163.0, 164.0, 165.0, 166.0, 167.0, 168.0, 169.0, 170.0, 171.0, 172.0, 173.0, 174.0, 175.0, 176.0, 177.0, 178.0, 179.0, 180.0, 181.0, 182.0, 183.0, 184.0, 185.0, 186.0, 187.0, 188.0, 189.0, 190.0, 191.0, 192.0, 193.0, 194.0, 195.0, 196.0, 197.0, 198.0, 199.0, 200.0, 201.0, 202.0, 203.0, 204.0, 205.0, 206.0, 207.0, 208.0, 209.0, 210.0, 211.0, 212.0, 213.0, 214.0, 215.0, 216.0, 217.0, 218.0, 219.0, 220.0, 221.0, 222.0, 223.0, 224.0, 225.0, 226.0, 227.0, 228.0, 229.0, 230.0, 231.0, 232.0, 233.0, 234.0, 235.0, 236.0, 237.0, 238.0, 239.0, 240.0, 241.0, 242.0, 243.0, 244.0, 245.0, 246.0, 247.0, 248.0, 249.0, 250.0, 251.0, 252.0, 253.0, 254.0, 255.0, 256.0, 257.0, 258.0, 259.0, 260.0, 261.0, 262.0, 263.0, 264.0, 265.0, 266.0, 267.0, 268.0, 269.0, 270.0, 271.0, 272.0, 273.0, 274.0, 275.0, 276.0, 277.0, 278.0, 279.0, 280.0, 281.0, 282.0, 283.0, 284.0, 285.0, 286.0, 287.0, 288.0, 289.0, 290.0, 291.0, 292.0, 293.0, 294.0, 295.0, 296.0, 297.0, 298.0, 299.0, 300.0, 301.0, 302.0, 303.0, 304.0, 305.0, 306.0, 307.0, 308.0, 309.0, 310.0, 311.0, 312.0, 313.0, 314.0, 315.0, 316.0, 317.0, 318.0, 319.0, 320.0, 321.0, 322.0, 323.0, 324.0, 325.0, 326.0, 327.0, 328.0, 329.0, 330.0, 331.0, 332.0, 333.0, 334.0, 335.0, 336.0, 337.0, 338.0, 339.0, 340.0, 341.0, 342.0, 343.0, 344.0, 345.0, 346.0, 347.0, 348.0, 349.0, 350.0, 351.0, 352.0, 353.0, 354.0, 355.0, 356.0, 357.0, 358.0, 359.0, 360.0, 361.0, 362.0, 363.0, 364.0, 365.0, 366.0, 367.0, 368.0, 369.0, 370.0, 371.0, 372.0, 373.0, 374.0, 375.0, 376.0, 377.0, 378.0, 379.0, 380.0, 381.0, 382.0, 383.0, 384.0, 385.0, 386.0, 387.0, 388.0, 389.0, 390.0, 391.0, 392.0, 393.0, 394.0, 395.0, 396.0, 397.0, 398.0, 399.0, 400.0, 401.0, 402.0, 403.0, 404.0, 405.0, 406.0, 407.0, 408.0, 409.0, 410.0, 411.0, 412.0, 413.0, 414.0, 415.0, 416.0, 417.0, 418.0, 419.0, 420.0, 421.0, 422.0, 423.0, 424.0, 425.0, 426.0, 427.0, 428.0, 429.0, 430.0, 431.0, 432.0, 433.0, 434.0, 435.0, 436.0, 437.0, 438.0, 439.0, 440.0, 441.0, 442.0, 443.0, 444.0, 445.0, 446.0, 447.0, 448.0, 449.0, 450.0, 451.0, 452.0, 453.0, 454.0, 455.0, 456.0, 457.0, 458.0, 459.0, 460.0, 461.0, 462.0, 463.0, 464.0, 465.0, 466.0, 467.0, 468.0, 469.0, 470.0, 471.0, 472.0, 473.0, 474.0, 475.0, 476.0, 477.0, 478.0, 479.0, 480.0, 481.0, 482.0, 483.0, 484.0, 485.0, 486.0, 487.0, 488.0, 489.0, 490.0, 491.0, 492.0, 493.0, 494.0, 495.0, 496.0, 497.0, 498.0, 499.0, 500.0, 501.0, 502.0, 503.0, 504.0, 505.0, 506.0, 507.0, 508.0, 509.0, 510.0, 511.0, 512.0, 513.0, 514.0, 515.0, 516.0, 517.0, 518.0, 519.0, 520.0, 521.0, 522.0, 523.0, 524.0, 525.0, 526.0, 527.0, 528.0, 529.0, 530.0, 531.0, 532.0, 533.0, 534.0, 535.0, 536.0, 537.0, 538.0, 539.0, 540.0, 541.0, 542.0, 543.0, 544.0, 545.0, 546.0, 547.0, 548.0, 549.0, 550.0, 551.0, 552.0, 553.0, 554.0, 555.0, 556.0, 557.0, 558.0, 559.0, 560.0, 561.0, 562.0, 563.0, 564.0, 565.0, 566.0, 567.0, 568.0, 569.0, 570.0, 571.0, 572.0, 573.0, 574.0, 575.0, 576.0, 577.0, 578.0, 579.0,

References

No decrease of the capacity would be adequate without a few words about the data flow on the bus. This map shows DOB as long a constant trace of which sections on the data bus are free and which are used. For each sector on the data bus it is determined whether it is free for the bus. It is represented by 0 (the least significant bit) represents LSN 0 and bit 1 (the most significant bit) represents LSN 1. A second byte represents LSN 2 and bit 7 LSN is in use and must not be written to, whereas a bit set to 1 means the sector is free for writing (part of a file). DOB is completely parallel to the data bus and it is allocated and freed data sectors where files are created and deleted. It should be noted that because direct sector access using SPIN-D and SPIN-T does not use the file system, the bitmap is not affected by these commands.

The size of the fat map varies according to the number of sectors allocated on the disk by OS/2MBT. That for the default size of Dragoon disk containing 750 sectors we need 750 bits in the map or 750/8=93.75 bytes. That fits easily into one sector. However if the disk is formatted by 80 tracks and 25 heads 200 sectors per track the number of sectors is 200*25=5000. These will require 300 bytes in the fat map — more than one standard Dragoon 500 sectors through output (2 sectors) for these large fatmaps if the fat is two sectors on the disk. Only 1440 in tracks 20 sectors 1 and 2, 5.76 200 5.760. It should be noted that the fat table is the first sector of the format.

Note that **Pointer 4** (bytes 23-24) contains zeros. This is a flag to show there are no more clusters for this file entry. It can help because this more than four clusters are required to store the whole file, especially when the disc is heavily fragmented and is frequently used. In this case, if necessary, it extends the number of storage pointers for the file slot. This is where the Continued flag of byte 1 comes in. Initial value for the bit indicates there is another comparison slot for this file. Subsequent is given by byte 25-26 of the slot. Byte 27 (flag) has changed its meaning depending on the state of the continued flag. It no longer contains the number of bytes in the last sector of the file but the slot number at the continuation of this entry. Directory slots are numbered starting from zero so some main slot occupies 23 slots after the second slot. Slot number 1 starts after 261 or byte offset history that first slot will be the first byte and so on. The second comparison slot may still be contained when it is age indicated by the Continued flag of the first byte of the slot. Since the filename is already stored into the first slot for the file, each continuation slot has a different file name in the first eight bytes from the first and last bytes it contains only the age positions (6 of 7) and plus two unused bytes 22 and 23 as shown below.

deleting using the `RLL` command. Here the bit is set to 1, and the bit map of the drive is updated to show that the geometry is changed. Clusters are now two in size. The filename and its associated cluster positions are not changed from the directory. The following command again `RLL` based map shows the entry is a regular. Likewise, the contents of the newly allocated clusters are not changed. I hope the `strip` flag is a bit clearer. It is that the filename which refers the `UNLINK`ing of hardy stripping on flag and re-creating the bit map. It will also completely record `RLL` based not do anything to order in the meantime since it is likely to have overwritten it or at least it is intended.

A newly introduced class Part of the program set to 1000 specifying 1) an initial file pointer, 2) the end of the directory, and 3) a contiguous series of pointers to buffers for each entry in the directory.

A good life: life leopards These are not listed in the directory but in the first two types of the life span. They have the following names:

	Year	01	02	03	04	05	06	07	08	09
Hire value:	\$G\$1									\$A\$1
				LORD ADOR		LEN ADOR		ENIG ADOR		
	TWO									

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Points1 Points2 Points3 Points4 Points5 Points6 Points7 Points8 Points9 Points10 Points11

Flag

Last and flag de Point 23 by line

As before, a pointer containing all sector signals, the end of the 512 byte type 25 will contain the number of bytes in the last sector of the record. The Continued flag and then byte 25 contains the number of the continued record.

When approaching through the doorway to archives and their cluster positions we have to be able to distinguish between the real entry for a file containing no message and the confirmed entry which on its own

Bytes 1 and 0 are used to identify the header; any other value than 00 and 01 will cause DOB to not recognize the header and assume the file is a data file. The presence of a header and its value (the file can be loaded directly into memory and provides the data required. Bytes 3 and 4 contain the address at which DOB should start moving the contents of the file into memory. Bytes 5 and 6 give the number of bytes to be loaded (i.e., number of lines of data).

Figure 1

Byte	Default value (Hex)	Interpretation
250	20	Number of leading zeros in CRC
254	12	Number of exponent bytes in CRC
255	0F	Complete words of byte 255
256	ED	Complete words of byte 256

The OS2DOS program PatchOS2

The program will add the information outlined above onto the fatmap. It will work only when the transfer is going from Dragon DOS to OS/2. Should the Dragon DOS file be a basic program or a memory image file (entry file) then the file is formatted in a directory and the user gives the option of removing the file head of 16MB the OS/2 file. If this is done then a new file with noheader added to the name is created. Thus the user has the option of keeping both versions or higher OS/2 files. A file which has a header information is copied as is. Should the user possess only one drive then the option is given for the drive to do both readings from a Dragon disc and writing to an OS/2 disc. This will mean a lot of disc exchanging in response to the prompts but at least a transfer is possible.

Coming to an error in the distributed device descriptors for IO and ICH in OS/2 DIAGNOSIS cannot be read clearly without a little playing with the device descriptor. This is because the descriptors supplied by Microsoft define the device as having every file allocated space in chunks (clusters) of 8 sectors in a file whereas Dragon discs are allocated

1-sector chunks. This can be overcome by patching the descriptor for the drive in which you want read the Dragon disc and in following way

OS-function	* Define OS/2 descriptor
OS: LDI	* Load the device descriptor
OS: ,+25	* Open offset 25 (Note the space between the two points)
OS: +1	* Cluster size = 1
OS: 0	* End the debugger

The above two lines just tell the patched device descriptor that it is called as a command file from the keyboard or the OS/2 startup file in which case the patch will be done automatically whenever OS/2 is booted. It is also possible to change the descriptor permanently whether it is in the boot file or a special descriptor file but this is not left to OS/2 experts. If you want to contact me and don't mind international telephone calls which are cheaper after 10:30 UK time, give me a ring on 016-3376052626 and I will gladly tell you how to do it. If the drive used for reading the Dragon disc is IO then the first command to the debugger would be L IO instead of L DI. In any case the device descriptor must be memory at the time of the patch just LOAD if not and it does not

appear OS/2 is patch every descriptor of the way since OS/2 normally gets its statistics information from the disc itself if there is a valid OS/2 file in the drive. This patch is

```
OS: chd io
or
OS: dr io
```

The OS/2 disc can then be removed from the drive and replaced with the Dragon disc. There should be no problems in reading it from then on.

```

PROCEDURE readdd
0000  [*
0001  [* Program is transfer a DRAGON-DOS file to OS/2
0002  [*
0003  [* Written by P A.Gaglian 7-June-87
0004  [*
0005  NEW Define our special types for easy directory access
0006  TYPE PatchType=LEN_INTEGER, NameType: BYTE
0007  TYPE DirEntry=Flags: BYTE, Name:STRING(60), Ext:STRING(30), Posns
0008  (4), PatchType, Last: BYTE
0009  TYPE EntryType=Flag: BYTE, Special? (PatchType), unused: INTEGER, Ext:
0010  -BYTE
0011  TYPE Header_Type=First_byte_type: BYTE, Load_Addr, Length, CREQ_Addr
0012  -INTEGER, Last_byte: BYTE
0013  [* All these variables using these special types *)
0014  DIR File_Directory(160), DirEntry
0015  DIR Extension_ExtType
0016  DIR ptr: PatchType
0017  DIR header: Header_Type
0018  [* Now Define the simple variables *)
0019  DIR First_read, Got_Header: BOOLEAN
0020  DIR OSName: STRING(10)
0021  DIR Drive, OSDrive: STRING(1)
0022  DIR OSName, OS, A, J, K: INTEGER
0023  DIR FileNum, Track, Sect, MByte, last_ext_ptr, Ext: INTEGER
0024  DIR ASCII, BINARY, Read, Load, DirEnd, Contained, End: BYTE
0025  DIR Pad: STRING(8)
0026  DIR Dummy, Reply, FF, Null: STRING(1)
0027  DIR Header, Src, MaxConts: INTEGER
0028  DIR Single_Done, More: BOOLEAN
0029  DIR Buffer(255), Onabyte: BYTE
0030  DIR Flag, Posns, Position, Offset: REAL
0031  [* Initialize some useful constants *)
0032  Define:=0000 (Buffer)
0033  ASCII:=1
0034  BINARY:=2
0035  MaxConts:=3
0036  MaxOnByte:=8

```



```

0205      Null:=0;HDD:=0
0206      FF:=0;HFF:=FF
0207      Pad:=""
0208      Head:=001
0209      Locked:=000
0210      DirEnd:=000
0211      Continues:=000
0212      Valid:=000
0213      File:=0
0214      (*-----Start of Main Program-----*)
0215      INPUT "Drive number of DRAGON disc? (Default=1):",Drive
0216      IF Drive="" THEN
0217         Drive:=1
0218      ENDIF
0219      OPEN "000:"/"&Drive;"&" READ
0220      SEEK #0,0
0221      INPUT "Drive number of GSP disc? (Default=0):",GSDrive
0222      IF GSDrive="" THEN
0223         GSDrive:=0
0224      ENDIF
0225      CMD:="/&"-GSDrive
0226      Single:=Drive+GSDrive & (" Single drive transfer ? ")
0227
0228      Tracks:=00
0229      J:=1
0230      IF Single THEN
0231         PRINT "Insert DRAGON source disc, then hit a key".
0232         (* Wait till he types something on the standard input gets *)
0233         GET #0, dummy
0234         PRINT
0235      ENDIF
0236      (* For loop reads the whole of the DRAGON directory into our array at
0237      picture "Directory" *)
0238      FOR Sect:=2 TO 17
0239         Position:=(Track*16+Sect)*000
0240         SEEK #0, Position
0241         FOR I:=1 TO 30
0242             GET #0, Directory(I)
0243             J:=J+1
0244         NEXT I
0245     NEXT Sect
0246     J:=1
0247     (* The WHILE loop prints out the valid filenames in the directory (eg
0248     other with their entry number *)
0249     WHILE LAND(Directory(J)) Flags, DirEnd)=0 DO
0250         FOR L:=1 TO 8
0251             (* Hex=00 requires strings to be terminated by 0FF *)
0252             EXITIF WORD(Directory(J).Name,L,1)=NULL THEN
0253                 Directory(J).Name=LEFT$(Directory(J).Name,L-1)+FF
0254             ENDIF
0255             NEXT L
0256             File:=Directory(J)
0257             (* Only print out slots which are valid header entries *)
0258             IF LAND(File.Flags,Valid-Head)=0 THEN
0259                 PRINT USING "13s,"&"",&"",&"",&"",J,File.Name,File.Ext,
0260
0261                 NumOnLine:=NumOnLine+1
0262                 IF NumOnLine=MaxOnLine THEN
0263                     PRINT
0264                     NumOnLine:=0
0265                 ENDIF
0266             ENDIF
0267             J:=J+1
0268         WEND
0269         PRINT

```



```

0750      (* Ask which file is required *)
0755      REPEAT
0760          INPUT "Select number of file to copy: ",Filename
0765          UNTIL Filename<0 AND Filename<=0
0770          IF Filename<=0 THEN
0775              END "Abort"
0780          ENDIF
0785          UNTIL LAND(Directory(Filename)-Flags,ValidHead)=0
0790          File =Directory(Filename)
0795          DSSName =File.Name+"-"+File.Ext
0800          IF Single THEN
0805              PRINT "Insert ONE destination disc, then hit a key"
0810
0815              GET #0,Dummy
0820              ENDIF
0825              CREATE DSSName,DSSName,UPDATE
0830              Move =LAND(File.Flags,Continued)+1
0835              First_read=TRUE
0840              Set_Header:=FALSE
0845              (* Handle the 1st entry list *)
0850              FOR i =1 TO 4
0855                  Get:=File.Ptrlist(i)
0860                  IF i=1 THEN
0865                      Done:=File.Ptrlist(i+1) Header=0
0870                      ELSE
0875                          Done:=NULLWord
0880                      ENDIF
0885                      HSet:=Ptrlist Header
0890                      IF Done THEN
0895                          HSet:=HSet+1
0900                      ENDIF
0905                      Position:=Ptr-LBN*256. % (* NOT multiply by a real *)
0910                      DSS:=DSS+Position
0915                      (* Read any possible header then record the whole of the first sect
or *)
0920                      IF First_read THEN
0925                          First_read:=NOT(First_read)
0930                          GET #DSS,header
0935                          (* Re-position to start of the file (header) *)
0940                          SEEK #DSS,Position
0945                          Get_Header:=header.First_byte+256 AND Header>Last_byte
0950                          BAA
0955                          ENDIF
0960                          FOR readout(DSS,DSSName,HSet,File,Buffer,Single)
0965                          EXITIF Done THEN " " EXIT
0970                          REAT 1
0975                          (* Now handle the extension entries if any *)
0980                          IF NOT(Done) THEN
0985                              Done:=LAND(Directory(Filename)-Flags,Continued)=0
0990                              ENDIF
0995                          IF Done THEN
1000                              Last_read_line:=File.Last
1005                          ELSE
1010                              Filename =Directory(Filename) Last
1015                              REPEAT
1020                                  Extension:=Directory(Filename)
1025                                  Move =LAND(Extension.Flags,Continued)+1
1030                                  FOR i =1 TO 7
1035                                      Get:=Extension.Ptrlist(i)
1040                                      (* Check if this is the last pointer in the list *)
1045                                      (* i is the next and is zero or if this is the 7th *)
1050                                      (* is there a continuation entry? *)
1055                                      IF i=7 THEN
1060                                          Done =Extension.Ptrlist(i+1) Header=0
1065                                          ELSE

```



```

0000      Done :=NOT( More)
0001  ENDIF
0002  MoveTo :=ptr MoveTo
0003  IF Done THEN
0004      (* If we're at the end only read Nsectors complete sectors *)
0005      (* Since the last one is normally only partly filled *)
0006      Nsectors:=Nsectors-1
0007  ENDIF
0008  Position:=ptrs LSize
0009  SEEK #000,Position
0010  (* Read Nsectors sectors *)
0011  REM random(1000,0000000,Nsectors,File,Buffer,Single)
0012  EXITIF Done THEN % ENDNEXT
0013  REPEAT
0014      IF Done THEN
0015          last_sector:=Extension Elast
0016          (* IF finished then the last byte given as the number *)
0017          (* of bytes to read in the last sector, otherwise the *)
0018          (* last byte points to the continuation slot *)
0019          (* and the REPEAT loop continues *)
0020      ELSE
0021          Filepos :=Extension Elast
0022      ENDIF
0023      UNTIL Done
0024  ENDIF
0025  (* Here we read the last (partly) sector *)
0026  REM randomsect(1000,0000000,last_sector,File,Buffer,Single)
0027
0028  CLOSE #000 (* Finished with OPENED files *)
0029  (* Here we print the info found in any file header *)
0030  IF Get_Header THEN
0031      IF header_type=BASIC THEN
0032          PRINT "File is a BASIC program file"
0033      ELSE
0034          IF header_type=BINARY THEN
0035              PRINT "File is a binary image file"
0036          ENDIF
0037          PRINT USING "Load address: %",hd,"",header Load_Addr;
0038          REM printd(header.Load_Addr)
0039          PRINT USING "Load length: %",hd,"",header Length;
0040          REM printd(header.Length)
0041          PRINT USING "ESEC address: %",hd,"",header ESEC_Addr;
0042          REM printd(header.ESEC_Addr)
0043          (* Allow the removal of the header if required *)
0044          INPUT "Remove the 9-byte header from the DOS copy? (Y/N)"
0045          Reply
0046          IF Reply="Y" OR Reply="y" THEN
0047              CREATE #000,DOSName+"_noheader".WRITE
0048              File:=#File-9
0049              SEEK #000header,9
0050              WHILE File=<=000-50
0051                  GET #000header,Buffer
0052                  PUT #000,Buffer
0053                  File:=File-Header
0054              ENDWHILE
0055              WHILE File=< 0-50
0056                  GET #000header,Onebyte
0057                  PUT #000,Onebyte
0058                  File:=File-1
0059              ENDWHILE
0060              CLOSE #000

```



```

1000      ENDF  %(" End of header removal ")
1001  ENDIF
1002  CLOSE #00000000
1003  PRINT
1004  END "Transfer complete"
PROCEDURE Readout
0000  [" Read N bytes from "in", starting at present position "]
0001  [" Output goes to "out" in "buffer", also checks "]
0002  PARAM in,out,INTEGER, N:INTEGER, flag:REAL, buffer(256):BYTE
0003  PARAM single:BOOLEAN
0004
0005  DIM i:INTEGER
0006  DIM dummy:STRING(1)
0007  i:=0
0008  WHILE i<= 00
0009      IF single THEN
0010          PRINT ^, PRINT "Insert DRAGON source disc, then hit a key"
0011          SET #0,dummy
0012          ENDF
0013          GET #in,buffer
0014          IF single THEN
0015              PRINT ^, PRINT "Insert Q&Q destination disc, then hit a key"
0016              SET #0,dummy
0017          ENDF
0018          PUT #out,buffer
0019          i:=i+1
0020      ENDWHILE
0021  flag:=flag+255.0%
PROCEDURE readpattern
0000  [" Read N bytes from "in", starting at present position "]
0001  [" Output goes to "out" in N_byte chunk "]
0002  PARAM in,out,N:INTEGER, flag:REAL, buffer(256):BYTE
0003  PARAM single:BOOLEAN
0004  DIM bits:BYTE, Nbyte,N:INTEGER
0005  DIM dummy:STRING(1)
0006  IF single THEN
0007      PRINT ^, PRINT "Insert DRAGON source disc, then hit a key"
0008      SET #0,dummy
0009  ENDF
0010  SET #in,buffer
0011  Nbyte:=0
0012  IF N=0 THEN
0013      Nbyte:=255
0014  ENDF
0015  IF single THEN
0016      PRINT ^, PRINT "Insert Q&Q destination disc, then hit a key"
0017      SET #0,dummy
0018  ENDF
0019  FOR i:=1 TO Nbyte
0020      bits:=buffer[i]
0021      PUT #out,bits
0022  NEXT i
0023  flag:=flag+Nbyte%
PROCEDURE Readr
0000  PARAM address:INTEGER
0001  temp:=address
0002  WHILE temp<= 00
0003      temp:=temp+65535.
0004  ENDWHILE
0005  PRINT " [", temp, "]"

```


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Price: £3.80 (cash+vat)

I have recently purchased a copy of PRiNT for information. I was amazed by the speed at which this program prints characters on a TV screen.

PRiNT offers 64x24 display. Unlike many others PRiNT displays which define characters one column only eg. Eupale 64-column text. PRiNT defines characters one line at a time with the last row of the matrix defining the second row, giving crystal clear display even on an ordinary black and white TV with contrast and brightness properly tuned up. In fact a thin gap is maintained between two 64s as a 12" TV.

Added advantages: printing speed adjustable to that of the standard CPC 6640 which would not suffer from Dragon Basic. Other features of PRiNT include a user definable character

facility. A formula has been included for the supplier. There are four control codes which may be sent to the driver using the PRiNT CtrlCode command. The effects generated are as follows:

Value of Z	Effect
12	Clear Screen
8	Backspace
7	Stop
1	Invert/True Video toggle

Being in 64 columns, the PRiNT CtrlCode command has to be repeated PRiNT X's where X has a value ranging from 0 to 63 and Y 0-24. The CLS command when used with any number will clear the screen (except with values greater than 8 which produce the normal copyright message). Full Auto-repeat of keys has been implemented. You may have Basic text again while in game background. Machine can work in any mode. The PRiNT ROM routines to output text such as 0000A or 0000B. The program takes up only about

2.5K when installed which is a relatively low figure.

The only drawback of PRiNT is that you cannot use it in the 64K mode if you have a Dragon 64.

Many serious business software packages such as word processors, report generators and bank accounts can benefit from it. The advantage is that you now have a screen which displays information and is half the size than before. Secondly 64 characters per line offers a comfortable width of an A4 size paper. This means that many programs can now be designed to fit. You See is What You Get best, in fact, the popular Barred and the newer bar the dragons are two such programs which take advantage of the characters.

Those of you have a Dragon 64 may incorporate these Auto-repeat PRiNT CtrlCode routines in Dragon's Supplementary Manual into PRiNT to do this you must first install PRiNT. The result is that you have a fast repeatable keyboard in addition to a fast screen. Words will not

be lost out when you type fast. The installation of the Auto-repeat action is however a little tedious, because of the already built in Auto-repeat routine in PRiNT. Microcom should consider adding a fast keyboard routine to PRiNT which would then be used in the PRiNT CtrlCode command.

At a cost of £5.00, PRiNT gives your Dragon a fast business worthy kind of screen that represents good value for money.

Finally I would appreciate a Microcom would consider producing a PRiNT characters display wordprocessor which offers features and standards similar to those found in Eupale. PRiNT offers an complete complete formatting (the includes a full width of line, word wrapping, automatic page turning, printing line and sublines, scrolling 128-column text and others like PRiNT 1001 and a second character set for the printer.

Dr. Gwyn Hoang



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when they are put, as long as we know when we're going. By and large to an average of one problem to every three or four but one, sometimes they're obvious to explain and others getting stuck. In the example above you might think the numbers 2, 3, 4, 5 go together better with 1 than 4, 5 and 6. Useful looking but I can't see how progress is either way.

Surely we going to make a distinction outer space and locations 2, 3, 4, 5 and 6 obviously appear to form a complete area. They could be for instance the central area in which the player starts his trip in. Location 10 looks like a corridor going off somewhere while location 11 could be heading off into the heart of the

advent. Start labelling areas on your map plate that and pretty soon you'll have about five or ten defined areas for your little location adventure (I will give before long). Knowing what's going to be there helps you start looking for problems. Location 2 could be the entrance to the locked room, a locked door which you would obviously need to get past in order to start the game. A problem straight away has to open the door if doors take long for the whole game to build up from your simple control on paper.

It is also worth drawing a wider map as I know to my cost I once designed a massive adventure game using decimal occupied hundreds of locations, and had well over sixty involved problems to solve. Looked great on my final badly-drawn map. It was also useless, since because I'd got too locations numbers, the writing was blurred, and the player was doomed to go round in circles for evermore. Putting the problem to rights took up an awful lot of time that I think I have had to waste if I'd got a wider guide map to back it.



Conclusion

The Dragon is talking away in the corner waiting to get started, and now that I've written something up and started to produce it the first part of my adventure game. Until then get that map drawn down, think about all the problems that the player might have to come across in your imaginary world, and label them. Clearly! Make sure that the game makes sense as a coherent whole, and that there are no obvious flaws or ridiculous elements that are just so ludicrous that nobody will ever solve them. Getting started is the first bit, so that you know roughly what every little bit in the map means to.

Finally, think about the sort of words that the player might have to use in it and thought through the completed game. A vocabulary list in other words, because that is what we will be looking at next time. Bye for now.



National Dragon Users' Group

HAJDUK writes a newsletter that on Dragon Users' Group Update is a nice way to do the same thing that the NUGU is. I'm doing people will find useful that advertising for the group is very low key. This is deliberate policy as the number of user groups which take money and the involvement of looking after people has meant that people are now wary of such groups. Unlike the National Dragon Users' Group, it has more on a personal recommendation basis, and our high member ship which is all of group must speak well for the group.

NUGU, like the National Dragon Users' Group, is a newsletter with members in the UK and abroad. It has been running for well over two years now and is likely to be a lot of us for as long as there are Dragon owners who have need for it. While it is not a necessity for a Dragon owner to join, I would urge them to give it every consideration. A strong sense of users can only help us to get more out of our money.

Membership is currently £7.50 a year, virtually unchanged since 1980. For this you get a monthly newsletter. Update which tries to give information from all spheres of interest in the group, software is more technical and news and news can tell them general information. More important than the newsletter though, are the groups other facilities. Tapping into the

Introduction by Philip Breed

parties of members, the group can help answer questions on practically any subject. Help can be only a telephone call away. If you're not actually solving your problems, we'll be sure to get enough to investigate it. How to put a case down? Some things for a specific problem? Programing difficult and? How to upgrade to SAS? etc.



There is also a lot of people who are interested in which are free to assist, though which some good buys can be had. The group has saved some programs of its own at a

very reasonable cost. A Postscripting system, also editor and graphics capability and output programs for 32k and 64k, as well as the DOS are available, as well as a detailed manual on how to do your own 32 to 64 upgrade. An on-line notes service is also available for computers and peripherals, an excellent way of passing the word to operators often hard to get about (the cheap about their machines that before — Cf) Just now the group has required paper on Microbit (page 700/8000), a graphics library has been started, and a direct help for various problems has been started.

The most important point about NUGU is that it is a group not a publication, and anyone joining to receive a monthly newsletter may well be disappointed. You will get out what you put in. Everyone no matter what level they are at, or what their interests are, has something to contribute to the group and if they do that they will find that by talking with and helping others they will benefit themselves. I have been a member for 18 months now and wish I had joined earlier. The group has helped me to spend my money wisely on improving my system, has given me an outlet for my pool table on which I have and helped me to expand my knowledge of the Dragon. I would highly recommend it to anyone who owns a Dragon.

Winners and Losers

Every month, Gordon Lee will look at some prize programming points from a previous month's competition.

DEFEND consisting of the solution to the Christmas competition, leaves the winner to this place (page 10) month's competition. December's competition page. The game for which a listing was given required us to use colours to store place codes a fairly long code (but for a list was not placed on or opposite it) a square of dimensions of the squares of life at 4. We numbered in sequence from 1 (top left) to 16 (bottom right). One possible solution is as follows:

Place orange on 16, orange on 12, yellow on 16, green on 11, red on 14, green on 2, yellow 4, green on 5, red on 4, orange on 10, green on 12, orange on 1, yellow on 5, orange on 3, and yellow on 8.

More to the competition, which was in the form of an appendix to a magazine page. It is a list of letters assigned to the letters A, F, R, M, M, Q, R, T, S and W such that SANTA is prime, PROST is a small prime, NORTH is a multiple of 11 and SNOWMAN is a perfect square.

My own solution is given on page 27 of the March edition. It lists three separate listings — one each to determine possible values for SNOWMAN, SANTA, and PROST. I mentioned the March edition and I have columns that read: Alex Thomas suggested that technique which was not a hundred per cent programming, as well as a check and reasoning that he must regard my solution, with its several cross-checking, as an unusual call to mind. However, I am certain that I am perfectly valid to submit information by hand from a number of separate (and simple) programs. For example, having listed possible values for SNOWMAN, we know that it must equal 6, and it can only be either 1, 2, 4, or 8. These features then programmed in to subdivide listings, quite a reduction in running time can be effected. There is also much less chance of an error creeping into a simple program than with a more complex one. This is a point that has been raised from a number of letters from readers who are still learning the basics of programming, and who ask for the problems (and their solutions) to be made more simple.

As a general principle (perhaps the best rule) is to either a list of solutions that provides the answer in the solutions, or programming time plus running time. However, for readers who are obsessive about these things, I have included the program from Terry Patterson's solution. This is a problem in one full program. Here, each character of the program lists for one of the word (which is in turn, and only values which pass each test, color is set on (using a GOSUB instruction) to the next section. Of all the entries submitted, this program was the only one that was in terms of logic and then compared as well as programming should be able to follow the method used. Note the sub routine at line 4000 which creates an array containing the primes from 2 to 2147483647.

are later used in lines 40 to 4000 to find the three smallest primes. My only comment on Patterson's solution is that the code statement STEP 2 at the end of line 4000 seems to be only interested in odd numbers as possible primes. Also, I would follow the GOSUB command at line 4000 to follow the program to run on it, but for the possibility of any alternative solutions.

Another alternative used slightly different instructions. Phil approved a program to find possible values for "PROST" NORTH and SNOWMAN. This, he reports, produces just one possible solution from which the value of the prime SANTA is found. Consequently, it is not necessary to include a check back at the listing itself.

D. R. Barber of Sutton Coldfield used a similar method, though including a prime check routine as a kind of confirmation. Mr Barber also asks for confirmation of the solution to the September competition is given on page 26 of the December Dragon User. This was due to a typographical error. He probably now realize I was February's winner and know where the correct solution given. Sorry that, for anyone, was caused.

Finally, my own personal favorite is the solution from Alex Thomas, who wrote: "I want to be perfectly frank, my mind has gone totally blank. The independent is too tough though I've tried hard enough I think Gordon Lee is a cheat."

Now, how did he know that???

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The solution is: SNOWMAN=146789, SANTA=2468, PROST=1468, SNOWMAN=146789.

MIKE GERRARD'S ADVENTURE TRAIL

What I suggest when you take from your brother's adventure column? The last query I noted is was that Sir Basil Blackwell taking Mike's (or his?) possibly help to finish date a tape within by his nameless Peter Gerrard? Hmmmm? Blackwell's last boy. The tape's question (has which accompanied an early tape or vice versa?) Asking adventures on the Chapel, and if anyone else is interested (maybe) I've adventures on tape although I wouldn't say that they were within a couple of years ago, then they must write to Duckworth. The CMI Peter Pichery 43, Gloucester Crescent, London NW6. Mention the capital if you want. I know you do, try anything for a discount (Duckworth's have a nice copy of the book off 40% off 50, and a good copy of the tape's call or write at the inside dept. at 01-658-5428 for further details postage inc. -50.) The calling me a nameless Mr. Blackwell's tape is already on its way to him.

Following from that, a very interesting letter from Andrew McEne of 408 Main Street, El Hendon, Ht. Wellingborough, Northants NN16 8BA. He apparently received a letter from Simon somebody or other who will probably get another mention before we're through, stating that all the best in the interests of Gimbels could be read by e-mailing the following command: FOR A-O TO 2020 PRINT CHRS (PEEQ) NEXTA.

To quote Andrew: "Well, I thought if you could chat with G. Gimbels why not do it with any other adventure? It works? All you have to do is read a (short) write it a cold start. A, be later on the computer - when you have listed it is all back as it has gone funny, but it is just the Gimbels. You can't start here by using G... THEM statement."

Doesn't someone this sort of thing? We do proceed that it is only used in GIMBELS (GIMBELS) and you have given up the hope of solving the game. With this statement Andrew has managed to make things of the Mountains of Koi, Temple of Chen and Zoggy. Interesting stuff.

Interestingly, Andrew (or Ray Williams has written to me with queries on the Mountains of Koi and Temple of Chen. Spelt the correct way? Better later has often mentioned the title he plays as a surrogate person as it looks as if that is another reason that I will have to adopt. Ray also

wants to know how to avoid getting stuck at a dead Mountain. Any offers, anyone? He says that he's got through twice with the correct thinking (the game, he's found the answer which he used to get under the tape, but then can't open the final tape due to a misremembered string. All help gratefully received).

Help in exchange for help seems to be another common play strategy you'd get your names into the business column (Richard Heston, residing at 68 Mansard in Maid Lane, Southampton ST10 5EP) has written in with a number of queries. Had to know what has to be done with the tape, which is in the middle. They can be (BUMP HCCUT RETRO) KIRKGA YB BROW DENTUT MIBS BAH HCHRS RETGAMHC YKA OF DEF. This backwards writing really slows down the typing speed, but he's got you. (Pardon me just thinking that too — Ed.) Richard also wants to know how to stop alive in the religion zone (and if he could get a security guard in Aqueduct 477. Well, presumably you've found the password and the map frame. Anyone who anyone and who is profoundly into religion should know that containing password and map frame produces a reliable weapon pill which you can use too.

And talking of Aqueduct 477, young Michael Edwards of Bromwich, who has been mentioned in this column almost as often as Simon Whitehouse (and I must admit his name rings a bell from somewhere else as well, isn't he? I have died to this you don't have to play that **** security robot game. Funny I don't remember reading this on the wrapper, but anyway lost the game (and when you've started press RESET) Type

POKE 64000, 64000
POKE 64000, 64000
POKE 64000, 64000
END

Type CUNT is indeed the solution of any object that you might have left falling around in the game (especially). That should also help George Stephans, who is a top jewellery style writer (GEMST CONJURY) in numerous letters (help) you can have (you might) and I can send a piece for you. Help sheets should have reached you by now and your last query on 'logical snips' should by now be solved.

But before we leave Richard Heston, he's been leaving/being left out, but he's willing to help you out with his knowledge of the game. See (Ed), Southampton and Wellingborough. As with all people who have (how addresses published) here, please send an SAE if you want a reply. Everything I've mentioned so far that is been sent to the column has accompanied their SAE, and although it looks sometimes as if they all have had replies by now, it is my fault that Wigan get dumped out of the FA Cup and the world is thrown into chaos? It is not. On the other hand, however I've received one or two really witty comments from people who have written (including SAEs) to people mentioned in this column and who have not had a reply. Shame on you if I can read Duckworth to write a few letters. I'm sure you can.

Peter Ryle is a genius by a show in the Gerard side. I can tell. Quizzes in mega abundance, one which is really of me. I can't because it's dropped up a couple of times. How do you get it to be a snake in Gimbels' mind? Having found some new you can (the BGM PORT and SELLING BGM). I must admit (the last hand) has caused a range of comments at one point, since he seems (in Gimbels' mind) to be asking how to get exceedingly drunk in the portfolio. (Some mistake, surely? Now, on taking over I received a wedge of letters full of queries, along with books a selection of it, of course and adventures. Two adventures that you have asked about were conspicuous by their absence from this list, the earlier mentioned Peter Michael Ray Williams was having trouble with and now Dennis Wright (Bromwich, no Wigan, but even a little, so more more I send out a gift for help).

On the large number of queries, the program that returns the map next on the supply, and many, the map (especially) feature at this game (especially) during that computer to calculate. If you've solved this, then apologies from stating what you will be obvious (but from the number of letters I received) perhaps many people are having problems here. No backward and my that have what so need of your pen. Be careful for the transporter are as follows:

Planet 0-4 5
Emerald 270-8
Water 1-8 0-3

For each place you must enter each number by pressing that number and/or letter and all the rest you must use **RECALL**. And if it doesn't work, call me James Klotzle not me. Anyone who lives in a place called Sandycrest is really be sure everything is recalled and it's all taken care of good. graphed advertises. It's a lot of fun to play. points. While it's all the time with your favorite graphed advertisement. It's best to do it. And while waiting for the machine to print out a receipt, you can see the two cards printed out and check the name and try and produce something better.

As an update to Miller's last column in which he mentioned the Chicagoan against Michael Glimcher, Andrew Hill the latest contestant at 121 Perry Jones Circle, Miami Beach 33139 (305) 434-0141, is also updating his *Entrepreneur* office file. Hill, started his yearly subscription a year in 1993 to better access, and has opportunity (Sunday) and covers costs. A sample issue is available for \$45 from Andrew. It might appear that the magazine is free over one year, but a more updated comparison to ENR had them were all cut by start-up costs.

Do you know how rarely made it. Almost at the end of the column, no mention of Sweden's tranquility and what happens? Let me (compaq) the here all edges, having about Sweden's owners who use Phaser and play Shader, hats for the PlayStation and download 425 (but the slowest move

Shade? does it mean his future's so bright his gills were shaded? and dragons please for me to mention yet another Dragon magazine. Okay I know, how I wish.

I'm excited about that magazine as it's a fun night talk about a hobby — and especially this one is called Dragon's Tail, end-of-year's subscription \$750. Since I haven't seen a copy yet (see later in this ad The Hunt) you will have a sneak-off your platters on tape, but first permit me to write to Jo Ellen Cagetti Dragon's Tail 3d director (Dine Moving Glass 1-800-697-2333) and end-of-year sample copies if you still want one to look at.

Perhaps someone will send me a copy

I hope that you enjoyed my first night into Designland. It's a design "hotbed" teeming over with established columns, but will be what can be done. Next month, I'll be looking at (among other things) how a given advertisement that people have sent in to become part of Country's other games that bring things up between under and there. Your letters are at Country, always welcome. I can already see the frustration and not said with them accordingly you know your names, you guys and the rest of you too —

— Scott K. (aka Scott K.)

Adventure Contact

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Age Group	Male	Female
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80-84	10	10
85-89	10	10
90-94	10	10
95-99	10	10

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Abstract

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Abstract

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Важнейшим из них является необходимость совершенствования государственного управления в сфере жилищно-коммунального хозяйства, в том числе в области жилищного строительства.

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Three letter cards

Gordon Lee shuffles uneasily while he waits to see what the cards say

WOULD be competitors often wait to say that they would like to enter the competition but feel that they lack the necessary experience to tackle the problems. In fact, apart from the possibility of winning one of the prizes, one of the spin-offs of attempting the competitions is the opportunity to devise original programs, starting with the illustration of the problem, finishing with the final program, which should, you hope, provide the correct answer. Many students possibly use their Dragons either only for listings recorded programs, or for copying listings from the magazine. In fact most of the competitions require only a logical approach plus a knowledge of some simple BASIC commands. Even the inevitable mistakes can help to pinpoint a particular pitfall, and the debugging of a program can prove particularly instructive. Also, the experience gained can have an application in other areas of programming.

This month, this column is devoted to all you beginners, so experienced programmers may like to jump into the competition at the point.

At the heart of all programming is the management of variables. Whether it is the trivial mathematical computation or allocation of variables a knowledge of them is essential for successful programming. Take a look at the following, and you will find that most programs have certain variable expressions or another. Note that these variables come in two flavours — numeric (used to store numbers) and string (used to store text or other characters). The string variables use a denotable by the dollar sign.

Quite often variables can be used to "mimic" actual objects or procedures. For example, if we wished to create a pack of cards, we could use listing 1. If thus typed in and run, the command PRINT PACK\$

will result a 52 character string containing aspects of the playing cards, in order that each card is represented by two characters in the string, for example, 3H, 4S, or AD, for the three of hearts, jack of spades and ace of diamonds respectively. From this it is easy to extract a card at random, for example, by typing in `X=INT(RND*(52+1)):PRINT MID$(PACK$,X,2)`.

The value X denotes the position in the string at which the random card is to be found, and must obviously be an odd number — hence the routine of multiplying by two and subtracting one. Thus, if the character and the text in the string is printed (with tabulation to get what is desired) a playing card value. An extension of this technique can be used to shuffle the cards. The computer does this by starting with an empty string (`SHUFF$=""`) and adding to this a series of 52 cards selected at random from the PACK\$ string. To

Listing 1

```
10 PACK$="":SUITS="CHDS":RANK$="A23456789TQK"
20 FOR S=1 TO 4:FOR R=1 TO 13
30 PACK$=PACK$+MID$(RANK$,R,1)+MID$(SUITS,S,1)
40 NEXT:NEXT
```

Listing 2

```
50 SHUFF$="":FOR N=52 TO 1 STEP-1:X=END(N)*2-1
60 SHUFF$=SHUFF$+MID$(PACK$,X,2)
70 PACK$=LEFT$(PACK$,X-1)+MID$(PACK$,X,2)
80 NEXT
```

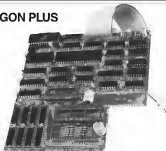
Listing 3

```
5 DIM RAND$(4)
90 C=1
100 FOR R=1 TO 4:RAND$(R)=RAND$(R)+MID$(SHUFF$,C,2):C=C+2:NEXT
110 IF C<14 THEN 100
```

Listing 4

```
50 H$=PACK$:T=1
60 SHUFF$="":FOR C=1 TO 26
70 SHUFF$=SHUFF$+MID$(H$,52+(C*2-1),2)+MID$(H$,C*2-1,2)
80 NEXT
90 PRINT:PRINT SHUFF$;" (";T;")"
100 IF SHUFF$=PACK$ THEN 120
110 T=T+1:H$=SHUFF$:GOTO 60
120 END
```


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